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Household water use, poverty and seasonality: Wealth effects, labour constraints, and minimal consumption in Ethiopia

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ABSTRACT

Data from a highland to lowland transect in the Oromia Region of eastern Ethiopia show that household water use is minimal, regardless of presence of improved sources, and variations in use are driven by interactions of poverty and rainfall variability. In the dry season, when many sources fail, use for hygiene drops perilously, particularly among poor households, as collection times rise and coincide with high demands for wage labour. Providing sufficient water for livestock is also a struggle for poor agropastoral households. Poorer households use less water because they have less labour for water collection and fewer storage and transport assets. Labour shortages also make nearer, unsafe sources preferable to more distant protected schemes. The health and livelihood benefits of improved water access depend on continuous use of sufficient safe water, by all, but we have limited knowledge of actual water use patterns. This paper aims to help address this gap, and documents intra-community inequities and seasonal variations in water access. These are not captured in coverage statistics, but are likely to occur wherever pronounced climate variability, inadequate infrastructure and severe poverty coincide.

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1. Introduction

In much of rural Africa, little is known about actual patterns of water availability, access and use. Ethiopia is no exception. Both national statistics and data from the WHO/UNICEF Joint Monitoring Programme indicate that water coverage is improving, though datasets vary considerably due to their different estimation methods[1], as noted by Butterworth et al., [5]. However little is known about how much water people actually use, from what sources, and how this varies over time and among communities and households – both for those who supposedly benefit from improved water source[2] coverage, and those who do not.

These questions matter because of the vital health and livelihoods benefits of water access [44,28,2,30,25,10,31,42,54]. Evidence increasingly suggests that even those supposedly served (having access to an improved source within a certain distance) do not necessarily have access to all these benefits. Equating coverage with full beneficial access to water rests on certain assumptions: (i) that all users have continuous and reliable access to water from improved sources; (ii) that water for domestic use is taken exclusively from improved sources, by all users, with no continuing use of less safe sources; and (iii) that users have adequate volumes of water to provide for all drinking, cooking and hygiene needs. These water access conditions are also relevant for populations using unimproved sources, to understand whether limitations in water access are imposing substantial costs and risks to them beyond those associated with poor water quality, although this is much less studied.

Various factors suggest that these conditions may not be met for many people in Ethiopia. First, an estimated 64% of rural households depend on surface water or springs [18], sources which respond relatively quickly to variations in rainfall. Rainfall in Ethiopia is intensely seasonal, with 70% of runoff generated between June and August [22]. Rainfall is also highly variable between years, and may be declining in some seasons [13]. The failure of both improved and unimproved water supplies is an important component of drought impacts [10,55] and seasonal failures have also been documented [16]. Finally, poverty levels are high, and the daily workloads of women – the primary water collectors – are demanding, with women often responsible for much of the household's agricultural work as well as domestic tasks [3,23]. Yet water collection can frequently require hours for a single trip; Cook et al. [15] found average collection times of just under 2 h in rural Oromia, for example. In the dry season, collection times can soar to 9 h due to limited availability of functioning water sources, meaning long distances to travel and long queues [1]. The necessity of collecting water means that other activities, such as income-generation, farm work, caring for family members and leisure, are foregone.

However there are limited empirical data from Ethiopia to test these aspects of water access directly. This is one gap which this paper seeks to fill. Evidence from elsewhere in the developing world, largely focused on those who nominally have access to improved schemes, suggests that the above conditions are often not met in reality.

The first condition for full access is continuous use of safe sources. There are growing concerns that a substantial proportion of water sources in sub-Saharan Africa are non-functional. This means that they either do not provide water, whether because of scheme breakdown and lack of repairs (e.g. the pump in a borehole has broken), poor design (e.g. the water table falls below the pumping depth of a well in the dry season), or local water shortage (e.g. a spring has dried up due to groundwater exploitation), or provide water of unacceptably low quantity or poor quality. Although rigorous large-scale studies are lacking, various estimates and local reports indicate cause for concern

[1] National estimates are based on the number of water supply schemes constructed, with the assumption that the actual number of users is equal to design capacities, regardless of considerations of population density and the presence of alternative sources. In contrast the World Health Organization/UNICEF Joint Monitoring Programme makes estimates based on extrapolation of data from a series of national household surveys conducted since the early 1990s, assuming a linear rate of increase over time (i.e., estimates are based on a best fit regression line extrapolated forward).

[2] 'An improved drinking-water source is defined as one that, by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with faecal matter' (definition used by the World Health Organization/UNICEF Joint Monitoring Programme). Improved water sources include piped water, standpipes, boreholes, protected dug wells, protected springs and rainwater. Unimproved water sources include unprotected springs, unprotected dug wells, tankered water and surface water from streams or ponds.